RESTRICTED

FM

ARMY AIR FORCES FIELD MANUAL

AIR DEFENSE

56-1

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BY ORDER OF THE SECRETARY OF WAR:

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(This manual supersedes FM 1-25, 24 December 1942.)

SECTION I

GENERAL

■ 1. AUTHORITY.—*a.* AR 95-5 charges the Commanding General of the Army Air Forces with the provision, training, and maintenance of all Army aviation means for the active air defense of the continental United States, of oversea garrisons, and of theaters of operations where located. The Commanding General, Army Air Forces, is also charged with the development of tactics and technique for Army air defense operation, including Aircraft Warning Service, fighter aviation, and coordination with the Commanding General, Army Ground Forces, in regard to the training of antiaircraft artillery, searchlights, and barrage balloons for employment in air defense.

b. Responsible army field force commanders are charged with making an air defense estimate and plan based on the policies and methods of operation as determined by the Comanding General of the Army Air Forces.

■ 2. PURPOSE AND SCOPE.—The purpose of this manual is to present a general statement of the organization for air defense. Its scope is limited to those principles and statements that are of general interest, that are matters involving War Department policy, and that may be included in a restricted manual.

SECTION II

MISSION

■ 3. GENERAL.—Air defense includes all measures necessary to prevent, to interfere with, or to reduce the effectiveness of hostile air action after hostile aircraft have left their own

airdromes or carriers. These measures include both active and passive air defense measures.

a. Active air defense comprises all measures aimed to destroy or threaten destruction of hostile aircraft and their crews in the air.

b. Passive air defense includes all other measures taken to minimize the effects of hostile air action.

c. The action of our own aviation in seeking out and destroying hostile airplanes on their bases, the bases themselves, essential aviation supplies, and airplane production facilities, while not considered as an element of air defense as defined herein, is a most important factor in our protection against hostile air action. It should be recognized that no practicable scale of air defense can secure complete immunity from the effects of hostile air action.

■ 4. RESPONSIBILITY FOR ACTIVE AIR DEFENSE.—*a.* The Commanding General of the Army Air Forces is responsible for the determination of requirements of the Army Air Forces air defense units with respect to personnel, matériel, facilities, and the preparation of necessary plans for the development, organization, equipment, training, tactical operation, supply, and maintenance thereof, including overseas garrisons and task forces and the assignment of personnel and matériel thereto. He is also responsible for the determination of tactical doctrine governing the employment of fighter aircraft and Aircraft Warning Service instruments in air defense. He will collaborate with the Commanding General, Army Ground Forces, in the preparation of tactical doctrine governing the employment in air defense of antiaircraft artillery, barrage balloons, and searchlights.

b. Theater of operations, base, department, defense, or similar commanders are responsible for the installation and operation of the complete air defense organization within their commands. This function is normally delegated to the fighter commander through the air force commander *within an air defense area prescribed by the theater of operations or similar commander. Ground units of the field force outside of the air defense area are responsible for providing local antiaircraft artillery protection through the fire of assigned or attached antiaircraft units.*

c. In addition to the air defense provided by fighter aircraft, antiaircraft artillery, barrage balloons, and other weapons manned by air defense troops, or the local antiaircraft protection provided by ground force AAA troops, each military agency must provide appropriate security measures against hostile air action, including the employment of available fire power.

■ 5. RESPONSIBILITY FOR PASSIVE AIR DEFENSE.—*a.* In time of war or during a national emergency, responsibility for instituting air raid precautionary measures rests with the commanding generals of the various defense commands. The defense commander delegates certain responsibilities to commanding generals of service commands. The defense commander delegates certain other responsibilities to fighter commanders through air force commanders. The defense commander and the various military authorities to whom he delegates responsibilities with respect to passive air defense are assisted by civilian agencies organized under the Office of Civilian Defense, which acts in an advisory capacity to such agencies.

b. Responsibilities of commanding generals of service commands include, or may include, functions pertaining to—

(1) Control of the civilian population in an emergency.

(2) Evacuation of civilians from designated areas.

(3) Local protection of installations, utilities, or sensitive points.

(4) Removal or detonation of time bombs or other unexploded projectiles.

(5) The enforcement of measures for the control of lighting.

c. Fighter commands organize and operate the Aircraft Warning Service, which is responsible for the collection and evaluation of information of hostile aircraft on which air raid warnings are based. This service is responsible, also, for decision as to which civilian warning districts shall be warned as air raids develop, and for transmission of properly timed warnings to such warning districts.

d. From the time air raid warnings are delivered at district warning centers, responsibility for their further dissemination and for the necessary air raid precautions indi-

cated by the general situation and specific warnings rests with the agencies organized under the Office of Civilian Defense and State and local defense councils.

e. The Office of Civilian Defense is charged by executive order with the following duties pertaining to air defense:

(1) Serve as the center for coordination of Federal civilian air defense activities which involve relationships between the Federal Government and State and local governments, territories, insular possessions, and the District of Columbia; establish and maintain contact with State and local governments and their defense agencies; and facilitate relationships between such units of government and the agencies of the Federal Government in respect to air defense problems.

(2) Assist State and local governments in the establishment of State and local defense councils or other agencies designed to coordinate civilian air defense activities.

(3) With the assistance of the Board for Civilian Protection, study and plan air raid precaution measures, sponsor and carry out civil air defense programs, recruit and train civilian auxiliaries, and disseminate information concerning civil air defense measures to appropriate officials of the Federal Government and State and local governments.

f. For the execution and enforcement of those passive air defense measures requiring interstate control, such as restriction of lighting and radio broadcasting, appropriate agencies of the Federal and State Governments are employed. Orders for the initiation of restriction, and for their termination, are issued by designated officers at fighter command installations.

SECTION III

ORGANIZATION FOR AIR DEFENSE

■ 6. FIGHTER COMMAND.—A fighter command is the command within an air force that is charged, among other duties, with the organization and conduct of active air defense within the air defense area prescribed by the theater of operations or similar commander. Basically, fighter commands are mobile units, with troops and equipment in their signal service to operate an Aircraft Warning Service whether or not existing communication facilities are available, and with

fighter aircraft to provide an active air defense of an area or of a field force in any locality. Both in the defense of areas and of fixed installations of field forces, antiaircraft artillery and barrage balloons may be assigned or attached to fighter commanders by the theater of operations or similar commander whenever communication facilities permit control by the fighter command. When a fighter command accompanies a field force to a theater of operations with little or no available existing wire communication, the fighter command signal service must be reinforced by signal construction troops.

a. Territorial division.—A fighter command is divided territorially into regions. The size and number of regions are determined principally by the number and location of vital installations, the amount of fighter aircraft, and the communication network available.

b. Air defense wing.—The tactical organization charged with air defense of a region is called an "air defense wing" if fighter aircraft are assigned to it. The air defense wing commander is charged with the organization and conduct of air defense measures within the region assigned to him. His principal duties are to—

(1) Initiate action against all hostile aircraft which fly within his region.

(2) Coordinate fighter aircraft and antiaircraft artillery action within his region and/or between subordinate fighter control areas.

(3) Control antiaircraft artillery units within his region.

(4) Coordinate intelligence within his region.

c. Air defense region.—The tactical organization charged with air defense of a region is called an "air defense region" if no fighter aircraft are assigned to it. Basically, the organization may consist only of the personnel required to operate the air defense region headquarters, the information center, and the Aircraft Warning Service. Thus, the responsibility of an air defense region commander may be limited to passive air defense measures—principally the issuance of air raid warnings. Antiaircraft artillery may be assigned to the air defense region. In this event, the region AAA commander will normally command the region. His principal

duties as air defense region commander will be identical with those listed above for the air defense wing commander save for the coordination of fighter aircraft and antiaircraft artillery action. He will not be charged with this responsibility because, as an air defense region commander, he will have no fighter aircraft assigned to him.

d. Fighter control area.—(1) The territorial region of an air defense wing may be divided into fighter control areas. The number of fighter control areas is determined by the size of the region, the number and location of objectives, and the strategical location of fighter airdromes. The purpose of the fighter control area is to provide more efficient control of fighter aircraft in the air. Generally, the fighter control area will include that territory which can be covered effectively by the control communication network provided. The area controller is responsible for the proper conduct of the air defense of his area, under the direction of the wing commander, who also normally acts through his controller. His principal duties are to—

(*a*) Put into effect all orders received from the wing.

(*b*) Coordinate, direct, and control fighter aircraft in the air.

(*c*) Coordinate operation of fighter aircraft and antiaircraft artillery units within the fighter control area.

(2) When antiaircraft artillery is employed for air defense purposes within the fighter control area, in the absence of fighter aviation, the area antiaircraft artillery commander normally commands the area.

e. Aircraft Warning Service.—Fighter commands organize and operate the mobile and fixed elements of the Aircraft Warning Service. When fighter commands are moved outside of their continental United States areas of responsibility the fixed elements of the Aircraft Warning Service are assigned to the fixed echelons of air forces and utilized for air raid warning.

■ 7. ANTIAIRCRAFT ARTILLERY.—*a. General.*—(1) All antiaircraft units employed in air defense operations within the air defense area of a fighter command will be under the command of the fighter command.

(2) Antiaircraft units assigned or attached to ground units of the field forces normally are not under the control of fighter commands. Whenever practicable, however, these units will establish liaison with adjacent antiaircraft units under the command of the fighter command for the purpose of—

(*a*) Receiving intelligence and identification information on friendly and enemy aerial activity.

(*b*) Receiving information relative to fire on "unseen targets."

(3) It is the responsibility of the ground force commanders that such liaison be established.

b. Antiaircraft artillery command.—All antiaircraft artillery units employed in air defense operations within the air defense area of the fighter command will be organized into an antiaircraft artillery command.

(1) *Fighter commander.*—So far as antiaircraft artillery is concerned, the principal duties of the fighter commander are—

(*a*) Command, through the antiaircraft artillery commander, of antiaircraft artillery units assigned or attached to the fighter command.

(*b*) The strategical disposition of the antiaircraft artillery. This disposition is based on the decision of the theater of operations or similar commander as to the priority of areas to be defended (air defense plan).

(*c*) Coordination of antiaircraft artillery and fighter action between subordinate echelons of command (normally accomplished through the medium of directives and standard operating procedure).

(*d*) Control of all antiaircraft artillery units engaged in air defense operations within his area.

(*e*) Coordination of intelligence throughout the elements of the air defense system over which he has control.

(2) *Antiaircraft artillery commander.*—The principal duties of the antiaircraft artillery commander are:

(*a*) Tactical disposition of antiaircraft artillery units.

(*b*) Training, administration, and supply of antiaircraft artillery units.

(*c*) Responsibility for combat efficiency of antiaircraft artillery units.

(*d*) To advise the fighter commander on matters affecting the strategical disposition and operation of antiaircraft artillery.

c. Lower echelons.—Antiaircraft artillery troops within the air defense wing (or region) and fighter control area will be organized into corresponding tactical commands to facilitate the control and conduct of operations.

■ 8. AIRCRAFT WARNING SERVICE.—*a.* The fighter command, or each region if so divided, organizes an Aircraft Warning Service and a system of command and control communications to—

(1) Collect, evaluate, and display at an information center all early, long-range warning intelligence of enemy aircraft and information of our own aviation necessary for the employment of fighter aircraft, antiaircraft artillery, and barrage balloons.

(2) Selectively transmit to district warning centers (civilian) and to military and naval forces, reports of the imminence and end of possible enemy air action.

(3) Issue commands for the control of lighting and radio emissions which may give aid to hostile aviation.

b. Because fighter aircraft require a higher order of timeliness and accuracy of intelligence of hostile aircraft than the other using agencies, the fighter aircraft requirements are taken as the objective of the Aircraft Warning Service. The intelligence displayed on operations boards for fighter aircraft incidentally meets the early long-range warning requirements of antiaircraft artillery, barrage balloons troops designated for defense against parachutists and forces landed from aircraft, and warnings to military and civilian agencies.

c. Within the continental United States, regions are divided into filter areas determined by—

(1) The centering arrangement of the commercial communication used in the collection of information.

(2) The size of the area which may be shown on a suitable scale for plotting and evaluating reports, and telling or transmitting filtered intelligence to the operations board at the region information center.

(3) Economy of operation and avoidance of undue interference with the normal use of commercial communication.

(4) Decentralization of operations for security and flexibility.

d. Filter areas within the continental United States are divided into air raid warning districts determined by collaboration of fighter commands with civilian defense agencies. The air raid warning district is the basic territorial division within which the precautionary measures called for by air raid warning messages are applied.

e. Provision is made for alternate and emergency operation of command posts, information centers, and separate filter centers in the event continued operation of primary installations becomes impracticable.

■ 9. ANTIAIRCRAFT ARTILLERY INTELLIGENCE SERVICE.—*a.* The antiaircraft artillery organizes an Antiaircraft Artillery Intelligence Service (AAAIS) and a system of command and control communications to—

(1) Collect, evaluate, and display in an AAA operations room the accurate, timely, close-in intelligence on enemy aircraft and information on our own aviation necessary for controlling the operations of fighter aircraft, antiaircraft artillery, searchlights, and barrage balloons.

(2) Selectively transmit to antiaircraft artillery, searchlights, and barrage balloons necessary control instructions. AAAIS information used in the control of fighter aircraft is transmitted over separate control communications.

b. The AAAIS is essential in controlling the fighter-searchlight team for defense against air attack at night.

c. The AAAIS receives early warning information from the Aircraft Warning Service, and transmits to the Aircraft Warning Service close-in information.

d. The details of organization and operation of the AAAIS are covered in FM 4–106.

SECTION IV

TACTICAL COORDINATION

■ 10. GENERAL.—The fighter commander is charged with coordinating the action of fighter aircraft and antiaircraft artillery so as to exploit to the maximum the capabilities

of each in an air defense area. This includes responsibility for coordination of air defense planning and such control of operations as may be necessary to effect successful joint operation. Control is exercised generally through the issue of directives and standing operating procedures, and, in specific instances, by—

a. Restriction of fire of antiaircraft weapons.
b. Restriction of searchlight operation.
c. Restriction of operation of barrage balloons.
d. Ordering special illumination.
e. Ordering of special fires.

■ 11. OPERATIONS ROOM.—As used in air defense terminology, the operations room is the control center for air defense operations in the area to which it pertains.

a. Fighter command, wing, or control area operations room.—This room is the focal point of air defense intelligence and contains the operations board upon which the intelligence is displayed. Based on the situation as shown on the operations board, decisions are made by the controller as to operation of the various air defense components in his area.

b. Antiaircraft artillery operations room.—The personnel and equipment necessary for coordination of antiaircraft artillery operations within the wing and/or fighter control area. It is in this room that the AAAIS information is displayed, and from which is exercised such direct control of antiaircraft artillery operations as is necessary. It is from here that control and coordination of the fighter-searchlight team is conducted. This room may be in a room of its own whenever possible, however, this room should be combined with the fighter operations room, either the fighter control area operations room or the wing operations room, whichever is more feasible.

■ 12. CONTROLLER.—The controller is the air force officer on duty in the operations room, who is the direct representative of the fighter or wing commander. During his tour of duty he assumes full responsibility for air defense operations in his area, makes decisions and acts in the name of his commanding officer.

■ 13. ANTIAIRCRAFT ARTILLERY OPERATIONS OFFICER.—The antiaircraft artillery officer on duty in the antiaircraft artillery operations room, who is the representative of the antiaircraft artillery commander in the area concerned. His principal duties are:

a. The transmission of control instructions from the controller to antiaircraft artillery units concerned.

b. To be cognizant of the location and status of all antiaircraft artillery units in his area. This includes antiaircraft units in harbor defenses and under the control of other forces, such as Navy, Coast Guard, and Merchant Marine.

c. To inform antiaircraft artillery units in his area of all aerial activity, friendly and enemy, in and in the vicinity of that area.

d. To supervise the operations of antiaircraft artillery personnel in the AAA operations room.

e. To take such action as may be necessary to assure the full participation of antiaircraft artillery in any given action.

f. To keep the antiaircraft artillery liaison officer in the wing operations room informed of location, status, and action taken by antiaircraft artillery units in the area.

g. To act as adviser to the controller on antiaircraft artillery matters.

■ 14. STANDING OPERATING PROCEDURE.—*a.* It is essential for commanders concerned to issue clear, concise operating instructions for the benefit of every individual empowered to control antiaircraft artillery, to open fire, to initiate searchlight action, or to operate barrage balloons.

b. The normal channel for control instructions is fighter command—air defense wing—fighter control area—antiaircraft artillery operations officer—units concerned. In most instances, control instructions, other than those contained in standing operating procedure, will originate in the fighter control area.

■ 15. RESTRICTIONS OF FIRE.—*a.* The antiaircraft artillery fire unit commander in immediate command is responsible for opening and ceasing fire. He is the individual responsible

for determining when friendly aviation is unnecessarily endangered by the fire of his unit.

b. The normal firing status of antiaircraft artillery will be that of "Release to open fire under instructions contained in local standing operating procedure" until specifically restricted by the controller.

c. The normal status of searchlights will be that of "Release to operate under instructions contained in local standing operating procedure" until specifically restricted by the controller.

d. Barrage balloons will normally be flown at ruling operating height.

e. Restrictions by fighter controllers will be imposed on the minimum number of antiaircraft artillery units consistent with the accomplishment of the desired aim. This restriction will be imposed for a specific purpose and for a definite period of time. However, information of the approach of friendly and enemy aviation to areas defended by antiaircraft artillery will be transmitted to these units at all times.

SECTION V

PRINCIPLES OF EMPLOYMENT

■ 16. GENERAL.—*a.* Fighter aircraft, antiaircraft artillery searchlights, and barrage balloons are employed to provid a coordinated and complementary active air defense. A are served by an Aircraft Warning Service which places befor the fighter commanders timely and usable intelligence o hostile aircraft and information of friendly aircraft. Th same intelligence and information are used to inform civ and other military and naval establishments of the air situa tion, and as the basis for orders for the restriction of suc lighting and radio emissions as may aid the enemy in a give situation.

b. A strategic air defense area includes the territory em bracing all the objectives of a probable hostile air campaig and for which a coordinated, integrated, and self-contain air defense plan and organization must be provided. T hostile air campaign may cover more than one strategic a defense area. It is contemplated that active air defen

forces will be shifted as indicated by the strategic air situation.

17. FIGHTER AVIATION.—*a.* Fighter aircraft may be employed in general or local defense. In a general defense, the fighter aircraft are disposed on airdromes over a broad front so as to be able to meet hostile aviation approaching to attack any of a large number of objectives. In a local defense, the fighter aircraft are disposed on airdromes to meet hostile aviation approaching to attack one objective or a group of objectives included within a small area. When the enemy has a choice of objectives extending over a wide area, the general defense is indicated. When the situation is such that the enemy aviation will direct its efforts toward a small area, a local defense of that area is indicated.

b. A fighter commander is prepared to organize and conduct a general air defense of an air space of any size within the capacity of the fighter aircraft and Aircraft Warning Service forces available to him. The size of an air space that can be defended by a given fighter force is a function of the method of fighter operation. The three methods of fighter operation in air defense are ground alert, air alert, and search patrol.

c. The ground alert method involves the retention of the defending fighter force on the ground, on an alert status, until information is received of the approach of enemy aircraft. A considerable outward extension of the Aircraft Warning Service is a prerequisite to the use of the ground alert method. This method is by far the most economical in force, as the fighter aircraft do not fly until an enemy is actually located.

d. The air alert method involves the maintenance of a fighter unit in the air, in a restricted locality, at all times during which the enemy may approach. Upon receipt of information of the approach of an enemy, the fighter unit in flight proceeds outward to intercept the enemy. The air alert method requires the continual maintenance of fighter aircraft in flight, and is considerably more expensive in force than the ground alert method. The air elert method is reported to only when the outer limit to which the Aircraft Warning Service can be extended will not permit the employ-

ment of the ground alert method. An Aircraft Warning Service, even though limited, is a prerequisite to the employment of the air alert method.

c. The search patrol method is used in the absence of an effective Aircraft Warning Service, and involves continual search for the enemy by fighter aircraft in flight. This method possesses all of the disadvantages of the air alert method and, in addition, requires continual search of the vast air space through which the enemy may approach. The search patrol method is so costly in force as to be prohibitive in the general case. It is resorted to only in exceptional circumstances when air superiority is required in a limited area for a limited time and a suitable Aircraft Warning Service cannot be made available.

■ 18. ANTIAIRCRAFT ARTILLERY.—*a.* Antiaircraft artillery possesses strategic mobility, and tactical mobility in the sense that it may be moved from one position or area to another within a short period of time. It has certain limitations. It cannot be expected to be available in sufficient quantity to provide an all around defense of all areas and establishments liable to air attack. Moreover, the operating altitude of hostile bombing airplanes often exceeds the effective altitude of antiaircraft artillery fire. Antiaircraft artillery is used to provide a local defense of relatively small areas. It is ready for action on very short notice under all conditions of visibility. Antiaircraft fire is difficult for enemy aviation to neutralize and forces hostile bombers to make their attacks at high altitudes. The lighter antiaircraft weapons (automatic weapons) make hostile attacks at low altitudes very difficult and costly and are particularly effective in preventing strafing of airdromes. Antiaircraft artillery protection for airdromes is of the greatest importance.

b. Antiaircraft artillery should be assigned to the defense of important objectives which, under a given situation, are most liable to hostile air attack, and whose geographic position reduces the effectiveness of fighter aircraft defense. When the objective is such that precision bombing is required for effective enemy air action, antiaircraft artillery is particularly effective. Examples of this type of objective

clude airdromes, naval establishments, power plants, especially important bridges, and other vital point objectives.

19. BARRAGE BALLOONS.—*a.* Barrage balloons deny the use of air space to enemy aviation through physical obstruction and through psychological effect when their presence is known. Whenever employed, they deny use of the air space from the ground to the operating height of the balloon. Their principal advantage is that, flying, they cannot be surprised by a sudden, unannounced raid. Their principal limitations are their vulnerability to hostile aerial fire and electric storms and their inability to fly in high winds. Their employment should be limited to areas where they will not seriously interfere with the essential operations of friendly aircraft.

b. In general, barrage balloons should be employed for the day and night defense of limited area objectives, which by virtue of their location near the frontier or shore line, are exposed to sudden attack.

20. AIRCRAFT WARNING SERVICE.—*a.* Visual, audio, and instrumental means are used to observe the location of both hostile and friendly aircraft. Reports of these observations are transmitted by telephone, radio, and other means to filter centers where the reports are plotted and evaluated. From the one or more filter centers of a region the resulting intelligence is at once told by telephone or other means to the operations board of the region or fighter command, where it is displayed in a manner adapted to the needs of the command and control system. Every effort is made to have the intelligence appear on the operations board with the shortest possible delay between observation and final plotting.

b. The ground observer system consists of observation posts strategically located and manned by civilian observers or in some instances by personnel from existing military and naval establishments. In active operation, each post is manned continuously 24 hours a day by two or more observers operating in shifts. Observers note, on a prescribed "flash message" form, certain information with respect to airplanes seen or heard and telephone this information immediately to filter centers. The time required for observers to move

from the point of observation to the telephone may greatly reduce the value of reports. Hence existing subscriber telephones are used only when they are located at points from which watch for aircraft can be effectively maintained and where they may be reached by the observer within 15 seconds. When these factors are not present, extension telephones are provided at Government expense. The enormous cost of installation precludes the use of direct telephone connection between observers and plotters at filter centers except in particularly vital and suitable locations. Toll message are used, and the telephone operating personnel is instructed and trained in routing and expediting establishment of circuits for Aircraft Warning Service flash messages. While one observer is noting the data to be included in the flash message, the other establishes telephone connection with the appropriate plotter at the filter center.

c. Instrumental means of observing aircraft are employed to—

(1) Extend detection and observation beyond frontiers and into enemy territory. This extension is usually, but not always, sufficient to permit the employment of fighter aviation on ground alert.

(2) Track aircraft to amplify or replace visual and aural observation in the area of fighter interception or to permit adequate air raid warnings to military, civil, or industrial establishments.

d. The importance of observer posts varies greatly with their location in respect to the objectives to be defended and the probable direction of approach of hostile aircraft. Normally the enemy may be expected to approach in the direction least favorable to ground observation. All directions of approach, however, should be defended. Without a positive means of observation seaward or beyond a land frontier the most favorable approach will be normally via such frontiers. Objectives on the coast or frontier may receive hostile air attack before any ground observers see or hear the attacking aircraft. Defending fighter aviation should engage the enemy in sufficient time to permit a minimum of 6 minutes of combat before the enemy reaches his objective. While desirable, this is not always practicable. Instrumental means

of aircraft detection will give initial warning of the approach of hostile aircraft on which orders for the take-off of fighter aircraft may be issued; the same or other instrumental means may give subsequent information of the enemy, thus enabling interceptions to be made without the use of ground observers. When the density of enemy air attacks passes the capacity of instrumental reporting means, or in the absence of such means, it is particularly desirable to have an efficient ground observer system covering the area over which fighter interceptions are made, and an additional outward area of about 10 minutes of enemy flying time. The area to be covered by ground observers should include all territory within the area of fighter interception and within 120 miles of areas and establishments which may be subject to hostile air attack. This will also provide ample warning and information for antiaircraft artillery and barrage balloons. At night, ground observers' reports will seldom be accurate enough to permit interception of the enemy by fighter aviation.

e. In order that air raid warnings and "all clear" warnings may be received in time to take all possible passive air defense precautions and still result in a minimum of interference with the normal life of communities and with industrial production, the Aircraft Warning Service should track hostile airplanes, throughout their flight over friendly territory, to furnish the intelligence for such selective warnings to district warning centers. A satisfactory interval between the issuance of warnings and the possible time of air attack on a given local civil defense area will vary with the importance of the area and its efficiency in disseminating air raid alarms and instituting passive defense measures. In general, for passive defense measures, 12 minutes are allowed for advance warning of the imminence of hostile air attack. The information required by fighter aviation to effect interception of hostile aircraft during daylight is sufficient to provide air raid warnings to civil district warning centers and to military and naval establishments.

f. When the density of enemy air operations at night is low, the ground observer system is of some value to fighter aviation, but without additional instrumental aids, the percentage of interceptions will be very low. The information

obtainable by ground observers in periods of low visibility and at night will meet the requirements for air raid warnings to local civil defense areas and ground troops.

g. The details of the organization and operation of the Aircraft Warning Service are covered in FM 11–25.

■ 21. CIVILIAN DEFENSE.—*a.* No practicable scale of active air defense can prevent hostile aircraft from delivering some of their fire on cities, public utilities, manufacturing establishments, and other nonmilitary targets. Warning districts are determined by the collaboration of the Office of Civilian Defense, local civil defense councils, and representatives of fighter commands. The dissemination of air raid warnings from the district warning centers established in each warning district, and the air raid precautions taken by civilians and civil establishments are responsiblities of cities, counties, and States, under the supervision and direction of the Boards of Civil Protection.

b. The plan for the dissemination of air raid warnings to civilians is covered in Air Raid Warning System, September 1941, No. 11, issued by the United States Office of Civilian Defense. Details of the operation of the system originating and transmitting civil air raid warnings from information and filter centers to district warning centers are covered in FM 11–25.

RESTRICTED

ARMY AIR FORCES FIELD MANUAL

AIR DEFENSE

CHANGES No. 1

WAR DEPARTMENT
WASHINGTON 25, D. C., 17 February 1945

FM 1–25, 15 June 1943, is changed as follows:

#5. RESPONSIBILITY FOR PASSIVE AIR DEFENSE (Superseded).—*a. General.*—All military echelons are responsible for instituting passive air defense measures as dictated by the situation and instructions from higher headquarters. Passive air defense measures normally taken by all military echelons include concealment, use of cover, dispersion, control of lights, and local warning systems. (See FM 100–5.)

b. In the zone of the interior.—Defense, base, department, and similar commanders are responsible for passive air defense within their respective areas. Such commanders may delegate certain passive air defense functions to service or similar commanders, except for the employment of smoke.

c. In theaters of operations.—(1) Theater commanders are responsible for passive air defense measures within theaters of operations.

(2) The theater commander normally delegates passive air defense functions to the communications zone commander for areas and installations within the communications zone, except for the employment of smoke. The communications zone commander may, in turn, delegate certain functions to base, intermediate, and advance section commanders.

(3) The theater commander normally delegates passive air defense functions to army (or army group) commanders and air force commanders for areas and installations under their control within the combat zone. Normally only such measures as are referred to in *a* above are instituted in the combat zone.

d. Civilian assistance.—Commanders responsible for passive air defense, and the military authorities to whom they delegate certain functions, may be assisted by civilian air defense agencies:

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(1) Within the continental United States and its territories or insular possessions, such civilian agencies include the Office of Civilian Defense, the Civil Aeronautics Administration, and other appropriate agencies of the government.

(2) Within occupied territory, similar civilian agencies may be organized under the military government of the occupying forces or the national government of the occupied territory, as determined by the theater (or similar) commander.

e. Coordination with active air defense.—Each responsible commander will coordinate passive air defense measures with the appropriate commander charged with the organization and operation of the active air defense of the area concerned. Air raid warnings are delivered by appropriate active air defense agencies to the designated passive air defense receiving agency. Responsibility for further dissemination and for the execution of the necessary air raid precautions rests with the military commander or civil organization charged with the execution of passive air defense functions.

f. Passive air defense measures.—Passive air defense measures (other than those in *a* above) which may be necessary include—

(1) Protection and control of the civilian population in emergencies.

(2) Evacuation of civilians from designated areas.

(3) Emergency repair of vital installations, such as roads sewers, communications, electric power, and other utilities.

(4) Fire prevention and protection.

(5) Bomb disposal.

(6) Protection against chemical warfare.

(7) Camouflage of vital manufacturing, utility, and similar establishments.

(8) Control of lighting and radio emissions, with particular attention to their usefulness as navigational aids to hostile aircraft.

(9) First aid, ambulance service, and provision for emergency hospitalization of both military personnel and civilians.

(10) Establishment of passive air defense control center for the receipt of air raid warnings, and receipt and dispatch of messages, and coordination of emergency services.

g. Passive air defense is a command function and all military personnel must be familiar with the local passive air defense plan. Unit commanders are responsible for normal security measures but further passive air defense measures may be required when units are bivouacked or quartered in or near populated places of vital installations. Specialized type units such as engineer, military police, ordnance, chemical, transportation, and medical units may be utilized to implement the passive air defense plan, and, when required, may be utilized to augment civilian services provided this does not interfere with military operations.

h. Although the use of smoke is classified as a passive air defense measure, its uncontrolled employment seriously affects the capabilities of the elements of the active air defense, particularly antiaircraft artillery. For this reason, plans for use of smoke as air defense measure must be carefully coordinated with and controlled by the active air defense commander of the area in which this use of smoke is contemplated.

[AG 300.7 (25 Jan 45)]

BY ORDER OF THE SECRETARY OF WAR:

G. C. MARSHALL
Chief of Staff

OFFICIAL:
J. A. ULIO
Major General
The Adjutant General

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For explanation of symbols, see FM 21–6.

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